1. A loudspeaker comprising a resonant panel-form member and a vibration exciting system on the panel-form member and adapted to apply bending wave energy thereto to cause the panel-form member to produce an acoustic output, wherein the vibration exciting system is adapted to apply torsion to the panel-form member.

C1

3. (Amended) A loudspeaker according to claim 34, wherein the vibration exciting system is adapted to apply shear to the panel-form member.

5. A loudspeaker according to claim 1, wherein the vibration exciting system comprises a suspension on which the panel-form member is mounted, the suspension acting as a pivot about which at least a portion of an edge of the panel-form member local to the vibration exciting system can hinge.

6. A loudspeaker according to claim 5, wherein the suspension is of a plastics foam of high shear stiffness.

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7. (Amended) A loudspeaker according to claim 34, wherein the vibration exciting system comprises a piezoelectric device attached to the panel-form member to apply a bending couple thereto by introducing alternating tension and compression to the panel-form member in the plane thereof.

8. A loudspeaker according to claim 7, wherein the piezoelectric device is attached to a face of the panel-form member.

9. A loudspeaker according to claim 8, comprising mirror-image piezoelectric devices attached to opposite faces of the panel-form member.

10. A loudspeaker according to claim 7, wherein the piezoelectric device has a portion disposed adjacent to the suspension, and a portion disposed remotely from the suspension.

11. A loudspeaker according to claim 7, wherein the piezoelectric device is a thin strip-like device fixed to the panel-form member by adhesive.

12. A loudspeaker according to claim 7, wherein the piezoelectric device is a unimorph device.

13. A loudspeaker according to claim 12, wherein the unimorph device comprises opposed parts arranged such that one part increases in length while the other part contracts.

C3 14. (Amended) A loudspeaker according to claim 34 or claim 7, wherein the panel-form member is transparent.

15. A loudspeaker according to claim 14, wherein the piezoelectric device is transparent.

16. A loudspeaker according to claim 7, wherein the piezoelectric device is of PZT.

C4 17. (Amended) A loudspeaker according to claim 34, wherein the vibration exciting system comprises an inertial device.

18. A loudspeaker according to claim 17, wherein the inertial device comprises an inertial mass rigidly fixed to the panel-form member to form a suspension pivot.

19. A loudspeaker according to claim 17, wherein the inertial device is an inertial vibration exciter.

20. A loudspeaker according to claim 19, comprising opposed inertial vibration exciters on opposite sides of the panel-form member.

21. A loudspeaker according to claim 19, comprising an additional inertial vibration exciter on the panel-form member and coupled to the first said inertial vibration exciter in anti-phase to damp unwanted whole body movement of the panel-form member.

22. A loudspeaker according to claim 1 or claim 5, wherein the vibration exciting system comprises an electrodynamic motor having a rotor with a current-carrying conductor array fixed to the panel-form member with its axis parallel to the plane of the

member to apply torsion thereto, and a magnet forming a magnetic field in which the rotor is positioned.

23. A loudspeaker according to claim 1 or claim 5, wherein the vibration exciting system comprises a bimorph piezoelectric device which is generally rectangular and orientated diagonally to act as a twister.

24. A loudspeaker according to claim 1 or claim 5, wherein the vibration exciting system comprises an element rigidly coupled to and projecting away from the panel-form member, and an exciter which induces bending moments in the element.

25. A loudspeaker according to claim 24, wherein the element is generally perpendicular to the panel-form member, bending moments are produced by displacement in a part of the element spaced from the panel-form member, and the displacement is generally perpendicular to the element.

26. A loudspeaker according to claim 25, wherein the displacement is effected using a piezoelectric device.

27. A loudspeaker according to claim 25, wherein the displacement is effected by an inertial device.

28. A method of making a loudspeaker having a resonant panel-form member adapted to be excited to produce an acoustic output by the application of bending wave energy, comprising defining the panel-form member, mapping the panel-form member to determine the location of nodal lines, arranging a vibration exciting system on the panel-form member to apply bending wave energy thereto, with the exciting system spanning a plurality of the nodal lines and mounting the vibration system exciting to the panel-form member to apply a couple thereto.

29. A method according to claim 28, wherein the panel-form member is defined in terms of geometry, size and/or mechanical impedance.

30. A method according to claim 28 or claim 29, wherein the panel-form member is mapped using finite element analysis.

31. A method according to claim 28, comprising mounting the panel-form member on a suspension such that the suspension acts as a pivot about which an adjacent portion of the panel-form member can hinge, and arranging and mounting a vibration exciter on the adjacent portion of the panel-form member to bend the panel-form member.

32. A vibration exciter for applying bending wave energy to a stiff resonant loudspeaker panel-form member and adapted to apply a bending couple to the member.

33. A loudspeaker according to claim 1, wherein the vibration exciter is coupled to the panel-form member to span a plurality of nodal lines in the panel-form member.

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34. (New) A loudspeaker comprising a panel-form member mounted on a suspension and a vibration exciter mounted on the panel-form member;

the vibration exciter being adapted to apply bending wave energy to the panel-form member and cause resonance, thereby producing an acoustic output;

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wherein the suspension acts as a pivot, thereby supporting the panel-form member in a simple fashion and causing nodal lines corresponding to the resonance of the panel-form member to move towards an edge of the member as compared to a generally corresponding but resiliently or freely edge-suspended panel-form member;

the vibration exciter being positioned so as to bridge across several of said nodal lines.

35. (New) A loudspeaker according to claim 34, wherein said suspension comprises a high shear stiffness material.

36. (New) A loudspeaker according to claim 35, wherein said suspension comprises high shear stiffness foam plastics material.

C5 Contd.

37. (New) A loudspeaker according to claim 34, claim 35 or claim 36, wherein the suspension acts as a pivot only in the region local to the exciter.

38. (New) A loudspeaker according to claim 37, wherein the suspension in regions other than the region local to the exciter is resilient.

39. (New) A loudspeaker according to claim 38, wherein the suspension in regions other than the region local to the exciter is soft foam material.